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Beemsterboer, W.; Stewart, R.; Groothoff, J.; Nijhuis, F.

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ON REGIONAL DIFFERENCES IN SICK LEAVE: THE ROLE OF WORK, INDIVIDUAL AND HEALTH CHARACTERISTICS AND SOCIO-CULTURAL ENVIRONMENT

WILLIBRORD BEEMSTERBOER¹, ROY STEWART², JOHAN GROOTHOFF², and FRANS NIJHUIS¹

¹ University of Maastricht, The Netherlands

Department of Health Organisation, Policy and Economics

² University of Groningen, The Netherlands

Department of Health Sciences, Groningen University Medical Center

Abstract

Objectives: Regional differences in sick leave frequency and duration determinants were studied between different professions (sale and cleaning) in different regions in the Netherlands (Utrecht and South Limburg) and the influence of socio-cultural factors on those determinants was explored. **Materials and Methods:** Employees in Utrecht and South Limburg were interviewed on work, individual and health characteristics. Sick leave data were obtained from the social fund. **Results:** A statistic comparison of sick leave frequency and duration figures between the two professions in the two regions showed that for a part similar, and for another part different determinants were associated with sick leave. **Conclusion:** In Utrecht, socio-cultural influence was assumed for the perception of autonomy and in South Limburg for health complaints. As a consequence, nationwide interventions to reduce sick leave should take into account the potential effects of socio-cultural factors on the type of sick leave determinants that predict sick leave per region.

Key words:

Sick leave determinants, Regions, Socio-cultural environment

INTRODUCTION

Socio-cultural differences between regions may play a role in the type of determinants that affect sick leave. This finding was the result of a study that explored regional differences in sick leave with regard to well known determinants of sick leave duration [1]. The study was performed among homogeneous groups in different regions in the Netherlands. In the present study, the idea of socio-cultural differences as an important factor in sick leave behaviour was explored further.

While sick leave duration is associated with many determinants, little is known about region-related socio-cultural factors that may play a role in the type of determinants that predominate. Generally, sick leave is associated with

illness, although the perception of health may differ between regions within countries, which may result in different outcomes in sick leave rates. The assumption is that, within a region with socio-cultural conditions similar for all professional groups, those conditions are — independent of professional group — reflected in the type of determinants that affect sick leave. As for the sick leave measures, frequency and duration, similarities in results for those two measures support the assumption that region-related socio-cultural phenomena are active.

Regional differences in sick leave frequency and duration

In the Netherlands, regional differences in sick leave frequency do exist [2], whereas research on determinants

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Address reprint requests to W. Beemsterboer, Hoogbrugstraat 20-B, 6221 CR Maastricht, The Netherlands (e-mail: willibrordbeemsterboer@uwnet.nl).

that could play a role in these differences appears to be scarce.

In a Finnish study on sick leave frequency, performed in three comparable demographic municipalities, it appeared that the sickness absence practice is the expression of the sickness absence habitus, which is deeply rooted in the social history of a locality as well as in the health-related behaviour of the residents [3–4]. In the Netherlands, the mean frequency of sick leave showed differences between the provinces Overijssel and Gelderland (1.72 spells) and Utrecht, North- and South-Holland (2.00 spells) [5]. These differences were, put in general terms, attributed to the economic structure of a region, characteristics of the population, health services and cultural differences [6]. Further on, the literature showed that aspects of the profession play an important role in sick leave behaviour [7–12].

The most important outcome of studies on regional differences in duration of sick leave is that they are the result of socio-economic class differences or circumstances and development [3–4,6,13–16].

Tordoir et al. [17] and Soeters [18] found a longer duration of sick leave in the Dutch region of South Limburg as compared to the rest of the country, and the regional organisation of health services (e.g. waiting-period before treated effectively) was said to be responsible for that. Later figures showed that the Limburg area had a still longer sick leave duration [19,20] and demonstrated differences in health between the Dutch province of Limburg and the rest of the country [20–24].

Socio-cultural characteristics and health and sick leave behaviour

Although Soeters [18] found that regional differences in sick leave were the result of regional differences in the organisation of health services, he emphasised that other factors could play a role as well, i.e. how people used medical services or visited their doctors. Soeters [18] performed his study independently of professional groups or specific companies and found that the mean duration of sick leave in the Dutch province of Limburg was longer than in the rest of the Netherlands.

Soeters [18] as well as Prins [25] referred to studies by Hofstee [26] and Hofstede [27]. According to those authors, regional differences in death rates and health consumption exist and these differences are apparently based on cultural characteristics of the local inhabitants. Lifestyle factors like eating habits, tobacco smoking and alcohol drinking have an influence on health and, consequently, on sick leave behaviour. This observation corresponds with the outcome of international research [3,4].

Sick leave is related not only with illness [15,28–29], but also with behaviour [30–32] that is subject to individual and socio-cultural factors such as habits, traditions and moral standards. These factors may have an impact on the perception of the work situation and on the perception of one's health. As a result, there may be regional differences in health status or in disease types as well as in morbidity and mortality rates [24].

Culture and social tradition, or lifestyle, may be considered to influence the health status of communities [26–27]. For the cultural identity of a population, this was defined by Hofstede [27] as a collective "programme" of the mind that discriminates groups from one another. Culture, expressed through people's behaviour and opinions, is a common characteristic of groups of people on the level of family, company, region or country [21].

Since health status is not a good predictor of sick leave [15,28–29], it is assumed that socio-cultural factors influence sick leave behaviour.

In regions with comparable health services, comparable demographic characteristics of the residents, a comparable socio-economic structure and a similar statutory social security system, employees with various professions live in an environment of different socio-cultural character. Differences in socio-cultural characteristics may find expression through similar determinants (different professions within regions) or different determinants (different socio-cultural environment between regions).

Research questions

The first research question we want to answer, is: How do sick leave frequency and duration, without regard to professional group, relate to relevant determinants between

different regions within a country, and are there differences between these regions in determinants that predict sick leave frequency and duration?

The second research question we want to answer, is: Are there, between different professional groups within a region, similarities in determinants that affect sick leave frequency and duration indicating an influence of socio-cultural environment? For each of the examined regions this second research question was divided in five subquestions:

1. How do sick leave frequency and duration compare between different professions in a region?
2. How do scores of individual sick leave frequency and duration determinants compare between different professions in a region?
3. How do sick leave frequency and duration relate to relevant determinants between different professions in a region?
4. Are there remarkable similarities or differences in determinants that predict sick leave frequency and duration between different professions within a region?
5. Are the determinants in which both professions per region differ correlated?

To answer both research questions a literature search was needed to identify sick leave frequency and duration determinants and to establish the direction of the effect of those determinants [1,33]. Identifying these determinants was merely a means to achieve the main purpose of the present study, i.e. to find any differences in effective sick leave frequency and duration determinants between regions based on their socio-cultural differences. Thus, our study focussed primarily on socio-cultural differences as a cause of regional differences in active sick leave frequency and duration determinants and was not a study on sick leave determinants as such.

MATERIALS AND METHODS

Since sick leave frequency and duration are influenced by various determinants, what we needed for this study was:

- at least two geographically and socio-culturally different regions,

- sick leave data of those regions,
- relevant sick leave frequency and duration determinants that are effective [1,33].

Registration of data on sick leave

Since one of the authors worked for the Dutch social fund Detam which registered the sick leave per profession and per region — although for specific professional groups only (sale, cleaning, trade) — it was possible to compare the relations between relevant sick leave determinants and registered sick leave between regions without regard to professional group, as well as to compare these relations within these regions with regard to professional group.

Regions and professions studied

It was necessary to select specific regions of our country, i.e. the Netherlands, to compare the sick leave behaviour of those regions.

Earlier studies [17–18] showed differences between the South Limburg region and the rest of the Netherlands. South Limburgers appear to have a less healthy lifestyle than their countrymen. Their body weight is higher [34] and they engage in less physical exercise [24]. Traditionally, South Limburgers drink more alcohol and show more tobacco addiction, although smoking is decreasing [24]. Bisscheroux et al. [35] found that Limburgers perceive a poorer health. Recently, the Nationaal Kompas Volksgezondheid 2001–2003 (National Public Health Compass 2001–2003, 2006) [36] showed that Limburgers differ from their countrymen in that 20–25% of them still perceive a relatively poor health, which was more than in any other part of the country (Table 1).

Another remarkable fact is that disability rates in 2000, 2003 and 2005 were higher in Limburg and over the years they increased simultaneously with rising national rates [36–37] (Table 2).

Taking into account the different regional sick leave frequency and duration figures in South Limburg versus the rest of the country, the higher disability rates in this region, its different lifestyle and the different socio-cultural history (the area was ruled by surrounding principalities until 1830 and consequently influenced by German and

Table 1. Indicators of health

Indicators of health	Limburg (%)			Netherlands (%)		
	Women	Men	Women and men	Women	Men	Women and men
Perception of own health (very good)*	62	78	–	74	82	–
Questions on one's own health (the higher score the poorer health)*	5.0	4.3	–	4.1	4.1	–
Perception of a poorer health 2001–2003 (RIVM)**	–	–	20–25	–	–	< 20–25
Chronic diseases and handicaps ¹	30	20	–	32	23	–
Visit doctor*	58	65	–	55	61	–

* Bisscheroux P, Nijhuis J, Kruijnen M, Knipschild P, Limonard C. Gezondheidsvademecum Limburg. Maastricht: Rijksuniversiteit Limburg; 1986. [in Dutch].

** National Institute of Public Health and the Environment. Nationaal Kompas Volksgezondheid. [cited 2008 Jan 14]. Available from: http://www.rivm.nl/vtv/object_document/o4237n16906.html [in Dutch].

Table 2. Disability pension rates

Rates	Limburg (%)	Netherlands (%)
Disability pension 1986*	9.5	6.8
Disability pension 2000**	10.7	8.8
Disability pension 2003***	11.1	8.9
Disability pension 2005***	10.1	8.0

*** As in Table 1.

*** Uitvoeringsinstituut Werknemersverzekeringen. Atlas Social Insurances 2003–2005. Amsterdam: UWV; 2005 [in Dutch].

Flemish/Wallonian socio-cultural traditions) and the different perception of health status, we considered the South Limburg population as different in socio-cultural terms from the rest of the Netherlands. Thus, for obvious reasons, it was decided to compare the region South Limburg with one of the other regions of our country.

Thus far we have mentioned some remarkable differences in health status between the province of Limburg and the rest of the Netherlands. Our efforts to find another region for comparison purposes were dominated by practical considerations like the central position of the city of Utrecht and this city being the residence of the social fund Detam. This fund was responsible for the certification and registration of sick leave for workers in sale, cleaning and trade. Sick leave duration figures from Detam showing differences between the regions Utrecht and South Limburg (mean sick leave duration in days: 23 and 29, respectively)

were an additional motivation to use the region Utrecht, i.e. the city of Utrecht and its immediate surroundings, for making comparisons with South Limburg. The comparable mixture of urban and rural qualities, South Limburg including the cities of Heerlen and Maastricht, and the socio-economic comparability of the regions were all the more reason to compare them in terms of sick leave behaviour.

The sale and cleaning jobs differ in the sense that workers in sale, as compared to workers in cleaning, generally experience less physical workload and that they work under rather strict supervision on normal working hours. The obviously different character of these two jobs and also the fairly well-grounded socio-cultural differences between the regions South Limburg and Utrecht caused us choose those two jobs and regions for the comparison. The regions showed, for sale as for cleaning, differences in sick leave in the sense that, in South Limburg, sick leave frequency was higher and sick leave duration was longer than was the case in Utrecht.

The specified differences between the regions Utrecht and South Limburg, and between the professions sale and cleaning, made it possible to compare both regions in the effect of sick leave frequency and duration determinants with regard to the profession sale and to the profession cleaning, and make a comparison between, as well as within, the two regions.

Participants

Workers were included in the study population as soon as they reported sick and unable to work. This was the best possible moment, because most of those reporting sick (> 95%) were visited by a controlling official of the social fund within one week. According to the Dutch social security system, all employers with employees working in sale and cleaning were committed to report sick employees to the social fund, where independent social health officials were responsible for certifying sick leave. In order to exclude specific effects of younger (< 20 years) and older (> 40 years) subjects on the results and, apart from the professional group, to enhance the homogeneity of the research groups in both regions, the participants had to be between 20 and 40 years old, and their reasons for reporting sick had to be "low back pain" or "uncomplicated stress". The decision to use these diagnostic categories had a pragmatic basis: it was assumed that, using commonly found diagnoses which leave the subject — other than specific diseases — much freedom to act (i.e. to report sick for work or not), a substantial number of participants (at least 50 to 100 per region) could be recruited within a relative short period of time (6 months). In Utrecht 79 employees in sale and 52 in cleaning, and in South Limburg 105 employees in sale and 85 in cleaning agreed to participate. These numbers were the outcome of the interview period of six months based on a random procedure in which every next employee meeting the requirements was asked to participate. In Utrecht, 37% (sale) and 25% (cleaning), while in South Limburg 18% (sale) and 32% (cleaning) workers did not respond. The responding and the non-responding groups were comparable in terms of age and gender. From the non-responding group, strictly individual characteristics, such as age and gender were the only determinants to be included in the statistical analyses. In Utrecht 56% of the responding group was working in sale and in cleaning this was 44%; in South Limburg 60% of the responding group was working in sale and in cleaning this was 40%. The figures justify the observation that the study populations were homogeneous. It is recognised that the sample size is small, even if the study examined what effects differences in regional socio-cultural

character might exercise on the type of determinants that affect sick leave duration. This is why the study was carried out on strictly homogeneous groups in socio-economically similar though geographically different regions under the jurisdiction of a uniform social security system.

A between professions within a region remarkable similarity in types of determinants that affect sick leave, is supposed to support the assumption of regional socio-cultural factors being of influence on sick leave.

Questionnaire

Some data on the individual and work characteristics of participants were derived from a specific form, completed by the employer and sent to the social fund to report the first day of sick leave. When employees agreed to participate, an interview booklet with questions they were asked to answer was handed out. In accordance with the results of the literature review, the booklet consisted of sets of questions that referred to the determinants identified earlier [1,33]. These questions were derived from the validated VAG (Vragenlijst Arbeid en Gezondheid, Questionnaire on Work and Health) [38]. Determinants belonging to similar categories were combined. Thus, the categorised determinants constitute the independent variables while sick leave frequency and duration are the dependent variables. Parameters of social and demographic developments were not investigated because legal, political and socio-economic status were similar throughout the country and the study population was, apart from professional group, homogeneous. The selected determinants were used as the basis for statistical analysis.

Time line

A study of the mean sick leave frequency or duration requires a certain period of registration which, in the present study, was the year before the day of reporting sick. Thus, the started spell of sick leave as such was not analysed, but was the sick leave pattern in the preceding year. For those reporting sick on the first of October, 1991, we referred to the period starting on the first of October, 1990; for those reporting sick on the first of December, 1991, we referred to the period starting on the first of December, 1990, and

so on. The mean frequency and duration of sick leave in the referred year was used in the analysis and they were calculated as follows. For the mean frequency the sum of the individual frequency indices was divided by the number of participants and for the mean duration the sum of the number of days of absenteeism was divided by the sum of the individual frequency indices. The interview period for both regions was 6 months, that is from 1st October 1991 till 31st March 1992.

Determinants and study design

The collected answers were classified for statistical purposes and, based on a factor analysis (not presented here), were combined to form compound determinants. Table 3 provides a classification of the sick leave frequency and duration determinants and gives the number of items as well as Cronbach's alpha for compound determinants. The level of Cronbach's alpha was fixed at 0.70 as this was a rather safe procedure in the sense that the value was less dependent on the number of items (constituting the compound determinant) than if higher levels were used [39]. A few compound determinants lacked internal coherence (Cronbach's alpha < 0.70) and were eliminated. They were "pollution at the workplace" and „air climate/pollution" of the working circumstances. The direction of the effect of determinants was given earlier [1,33].

Statistical analysis

The statistical analysis for the first research question included:

1. A t-test for the sick leave variable between the two regions.
2. A t-test for independent determinants between the two regions.
3. A regression analysis for frequency and for duration per region.
4. A comparison of the regression coefficients for the two regions [40].
5. A regression analysis for the determinants that both regions differed in, in order to find a possible correlation.

The statistical analysis for the second research question, performed for Utrecht and South Limburg, as well as for frequency and duration, included in accordance with the five subquestions for each region:

1. A t-test for the sick leave variable between the two professions in each region,
2. A t-test for independent determinants between the two professions in each region,
3. A regression analysis for frequency and for duration per region and per profession,
4. A comparison of the regression coefficients for the two professions per region,
5. A regression analysis for determinants distinguishing the two regions, in order to find any correlation.

A missing data analysis was performed in order to find out whether the number of missing data might influence results. If so, imputation was applied. Consequently, the possible influence of the missing data on the outcome was estimated. A boxplot was performed to check the potential effect of extreme/outlying scores on the outcome. A significance level of $p < 0.05$ was applied.

RESULTS

As far as the study populations for the analysis between both regions were concerned (first research question), the demographic data for South Limburg were: mean age 29.6 years, 85% female and 89% low level of education (vocational school level), and for Utrecht: mean age 29.3 years, 80% female and 94% low level of education. As far as the study populations for the analysis between both professions were concerned (second research question), the mean age in South Limburg was 26.5 years (sale) and 33.5 years (cleaning) and in Utrecht 26.8 years (sale) and 33.2 years (cleaning). In South Limburg the percentage of female participants was 87% (sale) and 82% (cleaning) and in Utrecht 84% (sale) and 73% (cleaning). Further on, the majority of participants had low levels of education: South Limburg 84% (sale) and 96% (cleaning), Utrecht 94% (sale) and 95% (cleaning). As in Utrecht 56% were working in sale and 44% in cleaning and in South Limburg 60% were working in sale and 40% in cleaning, for the first research question, the study populations between the regions were

Table 3. Selected determinants

Independent determinants	Number of items	Cronbach's alpha
Working conditions		
Appreciation for one's work (sum)	4	0.78
Expectations for the future (sum)	4	0.80
Satisfied with one's work (yes = 1/no = 0)	1	–
Positive about social-medical support during sick leave (yes = 1/no = 0)	1	–
Type of appointment (permanent = 1/temporarily = 0)	1	–
Working contents		
Autonomy (sum)	8	0.77
Workload (more work in same amount of time) (yes = 1/no = 0)	1	–
Mental workload (yes = 1/no = 0)	1	–
Match between work and level of education (yes = 1/no = 0)	1	–
Working relations		
Opinion about supervisors (sum)	9	0.90
Managers are well informed about the workplace (yes = 1/no = 0)	1	–
Good atmosphere at the workplace (yes = 1/no = 0)	1	–
Health status (perceived workload):		
Perceived physical workload (sum)	10	0.77
Perceived mental workload (sum)	5	0.72
Health status (health complaints):		
Questions about perceived health (sum)	22	0.86
Mental balance (sum)	21	0.86
Burnout due to work (sum)	6	0.72
Annual number of visits (family doctor)	1	–
Frequently taking medicines (yes = 1/no = 0)	1	–
Motivation		
Work-related factors (yes = 1/no = 0)	1	–
Home-related factors (sum)	8	0.70
Individual characteristics and circumstances		
Age	1	–
Gender (w = 1/m = 0)	1	–
Marital status (married = 1/not married = 0)	1	–
Satisfied with private circumstances (yes = 1/no = 0)	1	–
Level of education (high = 1, low, vocational school level = 0)	1	–
Alcohol consumption (yes = 1, no = 0)	1	–
Smoking (yes = 1, no = 0)	1	–

remarkably similar; for the second research question the study populations were different in terms of profession.

We will now turn to the first research question: How do sick leave frequency and duration, without regard to professional group, relate to relevant determinants between different regions within a country and are there differences between these regions in determinants that predict sick leave frequency and duration? The statistical analysis for this question led to the following results.

With regard to 1.: the statistical comparison of the mean frequency and duration of sick leave between the two regions showed a difference ($t = -4.234$, $p < 0.001$) between the mean sick leave frequency in South Limburg (1.770, $SD = 1.906$, $N = 183$) and in Utrecht (1.006, $SD = 1.223$, $N = 109$) as well as ($t = -3.838$, $p < 0.001$) between the mean sick leave duration in South Limburg (19.68 days, $SD = 24.758$, $N = 182$) and in Utrecht (10.05 days, $SD = 18.581$, $N = 109$).

With regard to 2.: in Utrecht as compared to South Limburg: subjects had lesser expectations for the future ($p = 0.040$) and were less satisfied with their work ($p = 0.024$), further on they perceived a better health ($p = 0.008$) and were less often married ($p = 0.001$).

With regard to 3.: per region a regression analysis for frequency and for duration was applied to examine the relation between the selected determinants as independent

variables, and the mean frequency and duration of sick leave as the dependent variable (Table 4).

In Utrecht a higher frequency and a longer duration of sick leave was observed if subjects experienced more autonomy. In South Limburg a longer duration of sick leave was observed if subjects showed a higher number of annual visits to the family doctor.

With regard to 4.: the outcomes of the comparisons that were made to establish differences in regression coefficients between the two regions, if any, led to the conclusion (see Table 4) that for duration a regional difference was found for the determinant called "annual number of visits (family doctor)".

The regression analysis for the first research question showed that regions differed in determinants that predicted sick leave frequency and duration and that for one determinant the regression coefficients differed as well.

With regard to 5.: as for only one determinant ["annual number of visits (family doctor)"] a difference between the regions was found, no regression analysis was performed in order to find a possible correlation for the determinants that both regions differed in.

We will now turn to the five subquestions of the second research question of the study, with the results of each region, to be followed immediately by the first and the second research question.

Table 4. Results of the regression analyses of sick leave frequency and duration determinants per region and of the comparison of the regression coefficients

Determinants	Utrecht			South Limburg		
	adjusted R Square	Beta	Sig	adjusted R Square	Beta	Sig
Sick leave frequency determinants						
Work contents	0.119 (N = 58)	–	–	0.001 (N = 99)		
Autonomy	–	0.345	0.009*	–	–0.086	0.416
Sick leave duration determinants						
Work contents	0.065 (N = 70)			0.002 (N = 98)		
Autonomy	–	0.326	0.007*	–	–0.132	0.211
Health status: health complaints	0.019 (N = 82)	–	–	0.164 (N = 134)		
Annual number of visits (family doctor)** ($p < 0.001$)	–	–0.18	0.887	–	0.358	< 0.001*

* $p < 0.05$.

** In comparing the regression coefficients a difference was found.

1. How do sick leave frequency and duration compare between different professions in a region?

In Utrecht the statistical comparison of the mean sick leave frequency and duration between the two professions showed no difference. In South Limburg the statistical comparison of the mean sick leave frequency and duration between the two professions showed a difference ($t = -2.409$, $p = 0.017$) with regard to sick leave duration: sale (15.91 days, $SD = 21.074$, $N = 105$) and cleaning (24.61 days, $SD = 27.185$, $N = 85$).

2. How do scores of individual sick leave frequency and duration determinants compare between different professions in a region?

In Utrecht, sale as compared to cleaning: the subjects experienced a lesser workload in the sense that there was not more work to do in the same amount of time ($p = 0.003$); further on they were younger of age ($p < 0.001$) and less often married ($p = 0.001$). In South Limburg, sale as compared to cleaning: the subjects experienced a lesser workload in the sense that there was not more work to do in the same amount of time ($p < 0.001$) and, at the same time, experienced a higher mental workload ($p < 0.001$) while the match between work and level of education ($p = 0.004$) was better; further on they found managers more often well informed about the workplace ($p = 0.004$) and subjects were (work-related factors) less motivated for work ($p = 0.016$), younger of age ($p < 0.001$), less often married ($p < 0.001$) and more often of higher education ($p = 0.010$).

In the comparison within the regions of the individual frequency and duration determinants there was a remarkable similarity in results between the regions in the sense that working contents regarding workload (more work to do in the same amount of time) were equally different appreciated by the employees of both professions; further on in both regions employees in sale were (individual characteristics and personal circumstances) younger ("age") and less often married ("marital status") than those in cleaning. These results indicate the influence of individual — and profession — i.e. not region-related determinants.

3. How do sick leave frequency and duration relate to relevant determinants between different professions in a region?

A regression analysis for frequency and duration for Utrecht as for South Limburg and for sale as for cleaning, was applied to examine the relation between the selected determinants as independent variables and the mean frequency and duration of sick leave as the dependent variable (Table 5). In Utrecht, in cleaning, a longer sick leave duration was observed if subjects experienced more autonomy. In South Limburg, in sale, a higher sick leave frequency was observed if subjects had a permanent appointment and a lower sick leave frequency was observed if they were positive about social medical support during sick leave. In cleaning, in the same region, a higher sick leave frequency was observed if subjects experienced more appreciation for their work and experienced more physical workload. Further on in South Limburg, in sale, a shorter sick leave duration was observed in case subjects had a positive opinion about their supervisors and a longer sick leave duration was observed if subjects had a permanent appointment or visited their family doctor more often and, in cleaning, a shorter sick leave duration was observed if subjects had a burnout due to work or if they were female.

4. Are there remarkable similarities or differences in determinants that predict sick leave frequency and duration between different professions within a region?

For Utrecht, for duration, the regression coefficients for the determinant called „autonomy” did not differ and had, for sale as for cleaning, a similar effect (see Table 5). For South Limburg, for frequency, the regression coefficients for the determinant called "perceived physical workload" did not differ and had, for sale as for cleaning, a similar effect (see Table 5). For South Limburg, for duration, the regression coefficients for the determinants called "type of appointment" and "annual number of visits (family doctor)" did not differ and had, for sale as for cleaning, a similar effect (see Table 5). In Utrecht, for frequency and for duration, the comparisons that were made to establish differences in regression coefficients between the two professions showed no such differences (see Table 5). The outcomes of the comparisons that were made to establish differences in regression coefficients between the two professions within South Limburg, if any, led to

Table 5. Results of the regression analyses of sick leave frequency and sick leave duration per profession and per region and of the comparison of the regression coefficients

Determinants	Sale			Cleaning		
	adjusted R Square	Beta	Sig	adjusted R Square	Beta	Sig
Utrecht (duration)						
Working contents	0.020 (N = 45)			0.091 (N = 25)		
autonomy		0.271	0.092		0.452	0.039*
South Limburg (frequency)						
Working conditions	0.102 (N = 85)			0.091 (N = 48)		
appreciation for one's work		-0.055	0.749		0.521	0.023*
positive about social-medical support during sick leave** (p = 0.037)		-0.296	0.010*		-0.096	0.600
type of appointment		0.268	0.018*		-0.191	0.188
Working contents	0.014 (N = 67)			0.092 (N = 32)		
autonomy		-0.259	0.050		0.062	0.771
Health status:						
perceived workload	0.018 (N = 85)			0.043 (N = 50)		
perceived physical workload		0.168	0.133		0.295	0.046*
South Limburg (duration)						
Working conditions	0.071 (N = 86)			0.023 (N = 48)		
type of appointment		0.256	0.025*		0.121	0.418
Working relations	0.042 (N = 70)			0.019 (N = 50)		
opinion about supervisors		-0.373	0.019*		0.099	0.647
Health status: health complaints	0.184 (N = 85)			0.168 (N = 49)		
burnout due to work** (p = 0.006)		0.159	0.177		-0.409	0.013*
annual number of visits (family doctor)		0.345	0.004*		0.229	0.123
Individual characteristics and personal circumstances	0.018 (N = 85)			0.180 (N = 47)		
gender** (p = 0.004)		0.119	0.326		-0.345	0.016*

Aberrations as in Table 4.

the conclusion (see Table 5) that, for frequency, differences were found for the determinant "positive about social medical support during sick leave" and, for duration, for the determinants called "burnout due to work", and "gender".

The regression analysis for the second research question showed that professions differed in determinants that predicted sick leave frequency and duration. Further on,

in comparing the regression coefficients, a difference was found for some determinants.

5. Are the determinants in which both professions per region differ correlated?

For Utrecht, for duration, for none of the determinants a difference between the professions was found. For South Limburg, for frequency, for only one determinant a difference between the professions was found, therefore no

regression analysis was performed in order to find a possible correlation for the determinants that both professions differed in. For South Limburg, for duration, a difference between the professions was found for the determinants called “burnout due to work” and „gender”. In order to find a possible correlation between these determinants a regression analysis was performed for the health complaints determinants called “burnout due to work” and “annual number of visits (family doctor)” and for the determinant called “gender”. The correlation matrix in the region South Limburg (sale and cleaning) showed that the determinants “burnout due to work” and “gender” were correlated ($0.07, p = 0.39$) as were the determinants “burnout due to work” and “annual number of visits (family doctor)” ($0.32, p < 0.01$). The Variance Inflation Factor (range 1.04–1.14) showed that there was no co-linearity of these determinants.

For sale as for cleaning, in Utrecht as in South Limburg, a substantial number of missings was found for the determinants called “expectations for the future”, “match between work and level of education”, “mental balance” and “alcohol consumption”. The missing data analysis showed that for some determinants the number of missing data influenced the results. After the imputation operation some determinants with a substantial number of missings kept an inappropriate influence on the results. It concerns the determinants “expectations for the future”, “match between work and level of education”, “mental balance” and “alcohol consumption”. These determinants, such as “level of education” and “satisfied with private circumstances” because of their extent of skewness, were excluded from further analysis. Most of the determinants that showed extreme/outlying scores did not affect the outcome and if so, they did not affect it after reducing the value of the scores to the next extreme score or the mean value.

DISCUSSION

The present study compared the responses to relevant sick leave determinants shown by strictly homogeneous groups in two regions of different socio-cultural character and also compared, within the same areas, the responses to relevant sick leave determinants of two different professions.

The first research question was: How do sick leave frequency and duration, without regard to professional group, relate to relevant determinants between different regions within a country and are there between these regions differences in determinants that predict sick leave frequency and duration?

Based on the results of the statistical analysis it was concluded that, within our country, regional differences in sick leave determinants for frequency and duration did exist and that different determinants predicted sick leave frequency and duration in different regions. As far as a possible influence of socio-cultural environment on duration is concerned, this applies for South Limburg to the determinant called “annual number of visits (family doctor)”.

The second research question was: Are there, between different professional groups within a region, similarities in determinants that affect sick leave frequency and duration indicating an influence of socio-cultural environment?

In Utrecht as in South Limburg the regression analysis showed that professions differed in determinants that predicted sick leave frequency and duration and that the regression coefficients differed for some determinants only. As for Utrecht, for duration, for sale as for cleaning, for the determinant called „autonomy” a similar effect was found. This observation may indicate that in Utrecht for duration, „autonomy” is a determinant that is influenced by socio-cultural environment.

As for South Limburg, for duration, for sale as for cleaning, for the determinants called “type of appointment” and „annual number of visits (family doctor)” a similar effect was found. And also for South Limburg, for frequency, for sale as for cleaning, for the determinant called “perceived physical workload” a similar effect was found. These observations may indicate that, in South Limburg, socio-cultural environment influences the sick leave frequency determinant called “perceived physical workload” and the sick leave duration determinants called “type of appointment” and “annual number of visits (family doctor)”.

In comparing the outcomes of the first and the second research question we concluded that they were, in South Limburg, for duration, corresponding for the determinant called “annual number of visits (family doctor)”. The

finding for South Limburg corresponds with the earlier finding that workers in sale showed a higher medical consumption leading to a longer sick leave duration than in Utrecht [1].

Socio-cultural characteristics of South Limburg as compared to the rest of the country and the relation with health and sick leave behaviour

As for the assumption that, seen from a socio-cultural perspective, South Limburg differs from the rest of the Netherlands, Soeters and Felling [41] observed that South Limburg has a different history than the rest of the country because for many centuries it was under the influence of German and Flemish/Wallonian socio-cultural traditions such as a Roman Catholic orientation, whereas the western part of the Netherlands is more of a Calvinistic nature. Philipsen [42] and Stevens and Van der Zee [21] assumed that the dominance of Roman Catholic culture in South Limburg was a factor that contributed to a less sober lifestyle of South Limburg residents. The Calvinistic north shows a healthier population with a longer life expectation. Stevens and Van der Zee [21] observed that smoking and drinking as possible socio-cultural manifestations of a less healthy life style, are a more accepted habit in daily life in South Limburg. These authors also found that South Limburg residents reported more health complaints and showed higher disability pension rates, as they still do [37] (Table 2). Sickness absence and disability pensions, being higher in South Limburg than in the rest of the Netherlands, will be a consequence of differences in health as well of culture, especially as far as perception of own health, own responsibility and consulting medical doctors are concerned.

As for some socio-cultural characteristics of the Southern Limburg population that were not health-related we observed the following. Socio-cultural differences between South Limburg and the rest of the country were found with regard to more collectivism in the Limburg area versus more individualism in the region Utrecht and, especially for youngsters, a stronger orientation on one's partner and family in South Limburg as compared to Utrecht [43].

A few other important indicators still suggest that socio-cultural factors affected the behaviour of South Limburg residents as they did a few decades earlier. Disability pensions in South Limburg continues to exceed those in the rest of the country (17.7% vs. 11.9) and the same applied to unemployment rates (2006 nationwide: 9%, Limburg: 11.3%) [44].

The study results in the light of socio-cultural factors

Limburgers are less healthy than their countrymen and live less healthy too [18]. In agreement with this, Limburgers visit their doctor more often, use more medicines, stay longer in hospitals and show higher death rates. Later studies confirmed the difference in health between Limburg and the rest of the country [22–24], be it that illness is not a good predictor of sick leave [15,28–29]. Sick leave is not only related with disease, but also with behaviour that is influenced by individual and socio-cultural characteristics like habits, traditions and moral standards [30–32]. People show a different perception of their own health or of their work situation and this leads to different choices in comparable circumstances. As a consequence, sick leave is often associated with a certain freedom to decide for it or not.

As for the outcomes in the region South Limburg, from a socio-cultural point of view we consider those as typical for the South Limburg population. This applies to the determinants called „perceived physical workload”, referring to health status in the sense that health complaints through physical perceived workload are an expression of a poor health [45–48], and the determinant called “annual number of visits (family doctor)”, referring to health status in the sense of health complaints. These determinants cause more sick leave. As the chosen diagnoses “low back pain” and “uncomplicated stress” leave the subject much freedom to act, we observe that the combination of the perception of a poor health and more medical consumption leads to a higher sick leave frequency and a longer sick leave duration. The less healthy lifestyle of the South Limburg residents will attribute to this phenomenon.

As for the outcomes in the Utrecht region, in contrast with the literature [49–52], a greater autonomy at the

workplace in Utrecht had, independent of profession, an increasing rather than reducing effect on sick leave frequency and duration. As the socio-cultural environment is supposed to affect this determinant, a possible explanation for the finding may be that, for sale, in the Utrecht area employees at the age of 20 to 40 years perceive “autonomy” at the workplace in the more individualistic sense that it has a connotation of more freedom rather than more responsibility, whereas employees of the same age in the South Limburg area perceive autonomy as an opportunity to prove their discipline in performing the job, an attitude that refers to a more collectivistic approach.

In accordance with the literature we found that, independent of profession, in South Limburg, though not significant, more autonomy led to a lower frequency and a shorter duration (Table 4) and that, for sale in South Limburg, autonomy appeared to be related with a lower frequency (Table 5). In comparing the effect of the „autonomy” determinant for cleaning in Utrecht with that for cleaning in South Limburg we observed, though not significant in the latter region, a longer sick leave duration in South Limburg and a higher frequency in Utrecht (Table 5), which may indicate the existence of a profession-related influence. In this regard we consider the difference between the two professions, sale and cleaning, as a possible explanation. In cleaning, supervision at the workplace is generally less strict with probably a paradoxical effect as far as perception of “autonomy” is concerned.

Whether “age” is a factor in the appreciation of „autonomy” at the workplace, for sale as for cleaning, needs further study. This also applies to the paradoxical finding, in South Limburg, that for cleaning “appreciation for one’s work” is associated with a heightening effect on frequency of sick leave. This finding may be attributable in that professional group to its less strict supervision at the workplace, leading to a different perception of such things as “appreciation for one’s work”. Further research is also necessary with regard to the finding in South Limburg that a burnout due to work is associated with a shorter duration of sick leave. Regarding being female, a possible

explanation for the finding that, for cleaning, this leads to a shorter duration of sick leave, may be the composition of the study population. In fact, the profession cleaning is in Utrecht (73%) as well as in South Limburg (82%) particularly practised by women and this may be the explanation for the finding.

Methodological considerations

Topicality of the study for the organisation of social security

Due to changes in the organisation of the social security system in the Netherlands, strict regional registration of sick leave frequency and duration has ceased to exist. From 2003 onwards the Nationale Verzuimstatistiek (Statistics Netherlands, 2006) [20] has been providing sick leave registration per Dutch *province* and what it shows is that interprovincial differences in sick leave still exist. Moreover, as the present study was carried out during the 1990s, the consistency in determinants predicting sick leave frequency and duration [1,33] adds to the relevance of its outcome.

In the Netherlands, sick leave has gradually decreased since the nineties. This decrease is generally attributed to changes in the organisation of social security. Occupation health services took the place of the social funds. Although these changes affected the country as a whole rather than specific regions, the social security system for the certification of sick leave has grown less uniform. Therefore, a future research on regional differences in sick leave, apart from the independent determinants presented in this study still effective today, will have to include also determinants of the statutory compensation system.

The present study seeks to find an explanation for regional differences in sick leave and applies an original research model. The model assumes the existence of regional differences in sick leave on the basis of socio-cultural differences, which find their expression in well-known sick leave determinants. Changes in the organisation of the social security system will not alter the present theoretical model as such and at the time the study was performed, the two regions had the same statutory compensation system, i.e. employees reporting sick experienced a similar approach.

Subjects

Subjects for the study were recruited at a time when they reported sick. An alternative approach would have been to study the employees of a few big companies. This would have been a better method to cover the entire group of workers in sale and cleaning. However, for practical reasons it was decided to include only those who reported sick at some point in time. Relevant individual data as well as systematically registered individual absenteeism data could easily be obtained from the social fund. Actually, it would have been a great disadvantage to study the employees of a few big companies because the outcome might have been strongly affected by their specific, company-related culture of absenteeism. In this context it is important to mention the exclusion of company-specific characteristics that often play an important role in sick leave behaviour [53–54], while the subjects of the present study were recruited from all kinds of companies, working in the same kind of household cleaning (i.e. not industrial cleaning) and living in similar socio-economic conditions.

Small sample size

Although the samples were small, the statistical analyses were performed on study populations that were remarkably similar in nature. As was pointed out earlier and is summarised here, the study populations were homogeneous in age, gender, level of education and profession; their socio-economic circumstances were similar, as was the quality of health services; there was similarity in employment contracts and in the administrative implementation of social security regulations; and, finally, both study populations had similar ethnic backgrounds and originated from areas with a similar mixture of urban and rural qualities.

Number of spells suffered by participants

By starting from a reported case of sick leave when recruiting the study subjects, it would seem as if the participants had at least one spell of sick leave during the study period while so-called “zero” sick leaves were excluded. This assumption is not correct. The time we referred to was the 12-month period preceding the first day of sick

leave. Thus, it is possible that participants had a “zero” frequency or duration of sick leave. Furthermore, once people report sick for work they apparently show a greater tendency to have another sick leave than people who never reported sick [55], so the results of this study are representative for those employees who were on sick leave at some point in time rather than for those who never had sick leave before.

Opposite signs

As for the first research question, the standardised regression coefficients showed opposite signs (Table 4). This finding supports the conclusion that, between regions, different determinants may predict sick leave frequency and duration and that the underlying causes may be of socio-cultural character. As for the second research question, for several determinants the standardised regression coefficients showed, for frequency and for duration, opposite signs (Table 5). This finding indicates that between professions different determinants may predict sick leave frequency and duration and that the underlying causes may be profession-related.

Possible correlations between the independent determinants

In interpreting the outcome it should be realised that correlations between independent determinants were not the object of study, although such correlations may exist. For instance, a notable gender-related effect may be attributed to a number of other factors such as social circumstances and the work situation [56–59] and qualities of the workplace [60–62]. In developing a policy to reduce the mean frequency and duration of sick leave in a specific region it will be necessary to take into account any correlations between determinants before drawing conclusions.

Analysis per category

It would have increased our understanding of the association between determinants and observed sick leave duration if the entire group of selected determinants could be analysed in a single regression analysis. However, a regression analysis of all selected determinants was not

a realistic option because the number of participants actually participating in the analysis (N) would have been quite small due to the number of missing data which would have made the estimates of the regression analysis unreliable. Thus, for pragmatic reasons, the determinants were classified according to the categories they belonged to and then analysed per category. Meanwhile, considering a possible correlation between determinants in which the regions (first research question) or the professions per region (second research question) differed, a regression analysis for the relevant determinants was performed.

Conclusion and Practical Implications

The results of this study indicate an influence of socio-cultural environment on determinants of sick leave next to the influence of characteristics of health status, the work situation or professional group. The results are so far generalisable that, in case nationwide measures are intended to reduce sick leave frequency or duration, one has to take into account that determinants that predict sick leave frequency or duration may differ per region and that only tailor-made interventions, focused on those determinants that predict sick leave frequency or duration per region, may be effective.

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